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UNITED STATES DEPARTMENT OF AGRICULTURE
 Agricultural Research Service
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STATISTICAL NEEDS IN THE AGRICULTURAL RESEARCH ADMINISTRATION ^{1/}

An analysis of the statistical services needed by and available to the research workers of the Agricultural Research Administration, to be made by the Department Committee on Experimental Design, was requested by Dr. Cardon on December 13, 1949. The basis of this report is a questionnaire (Appendix A) covering research units whose work requires ^{2/} some statistical analysis.

The questionnaires were sent to the seven Bureaus of the ARA at the end of 1951. A response was requested from each work project leader. The organization of the units having some statistical activities (designated herein as research units) is shown by Bureau in Appendix ^{3/} together with the organizational level of the 148 respondents. These levels cover the wide range from whole divisions to subdivisions of sections because of variation among the Bureaus in organization and in distribution of the questionnaires.

In every Bureau, need was expressed for additional statistical services. About a third of the ARA respondents wanted services requiring the time of 10.6 statisticians. Eight other requests were omitted from this tabulation because they did not include estimates of the amount of service desired.

Table 1 - Respondents wanting additional statistical services

Bureau	Statisticians	Respondents wanting	
	wanted	Services	Percent ^{a/}
	Man equivalent	Number	
AI	2.4	13	36
AIC	3.6	15	41
DI	.1	1	25
EPQ	1.9	6	30
ES	.1	1	100
HNHE	1.5	4	50
PISAE	1.0	6	14
TOTAL	10.6	46	31

^{a/} Based on number reporting shown in Table 3, Column 2.

^{1/} The compilation of the data from the survey and the text of this report are largely the efforts of Mrs. Evelyn Grossman of the Home Economics Branch, A.R.S.
^{2/} Determined from descriptions of activities in the U.S.D.A. Organization Functional Charts and confirmed by each bureau representative on the Committee.
^{3/} Excludes Office of Experiment Stations. One questionnaire was answered by the head of the division in charge of the two federally operated programs.
^{4/} Two in AI; 2 in AIC; 3 in EPQ; and 1 in HNHE.

Every Bureau had at least one non-professional statistician on the staff. (Table 2) Professional statisticians were employed by the Bureaus of (1) Animal Industry, (2) Human Nutrition and Home Economics, and (3) Plant Industry, Soils and

Agricultural Engineering. Informal professional services were available to other Bureaus.

Just under half (48%) of the divisions had at least one professional statistician on the staff. About two-thirds (69%) had subject specialists on the staff (chemists, economists, etc.) not formally classified as statisticians who advised others on statistical problems. Thirty-four percent had both and 17 percent had neither. An additional group (25%) had contact with professional statisticians at nearby experiment stations and universities, and 10 percent had similar contacts with non-professional statisticians. In all, 91 percent of the divisions had access to the services of a statistician; 73 percent having professional, 79 percent non-professional, with 60 percent having the services of both.

Table 2 - ARA Divisions ^{a/} by organizational position of statisticians, by Bureau

Bureau	:		:		Divisions		Reporting	
	: All		: Either Prof. or		: Prof		Statist'n	
	: Divi- sions		: All		: Non Prof. Stat.		: On	
	: On Staff		: Other		b/		Staff	
	(No)	(No)	(No)	(No)	(No)	(No)	(No)	(No)
AI	3	3	3	0	1	1	3	0
AIC <i>c/</i>	6	5	4	0	0	3	4	0
DI	4	4	3	1	0	1	3	1
EPQ	13	11	5	3	0	5	5	2
ES	1	1	1	0	0	1	1	0
HNHE	4	4	4	0	4	0	3	0
PISAE	22	20	20	0	18	1	14	2
TOTAL	53	48	40	4	23	12	33	5
Percent of all Reporting	100	83	8	48	25	69	10	

- a/ Those having some statistical activities
- b/ Includes divisions making informal use of statistical services at nearby experiment stations, universities and through personal acquaintance; excludes divisions with staff statisticians.
- c/ Includes 4 regional laboratories and 2 divisions.

Because a statistician does not necessarily service a whole division, Table 3 was prepared to show the availability of statistical services to the individual respondents. About 30 percent could consult a professional staff statistician; about half, a non-professional staff statistician. Twenty percent were serviced by both, leaving 40 percent with no staff statisticians, professional or non-professional. Non staff statistical services were available to a few others, 20 percent of the respondents getting help from professional statisticians and about 10 percent from non-professional statisticians. In all, three quarters of the respondents had some statistical service.

Table 3 - ARA Research Units^{a/} by organizational position of statisticians, by Bureau

Bureau	Report-:		Reporting Research Units Having						
	All	ing	Either Prof. or	Prof. Statist'n	Non-Prof. Statist'n	On	Other	On	Other
	Research	Research	Non-Prof. Stat.	On Staff	Other b/	Staff	b/	Staff	b/
	(No)	(No)	(No)	(No)	(No)	(No)	(No)	(No)	(No)
AI	38	36	11	8	1	9	11	7	
AIC	41	37	23	3	0	8	23	0	
DI	4	4	3	1	0	1	3	1	
EPQ	22	20	4	7	0	5	4	6	
ES	1	1	1	0	0	1	1	0	
HNHE	8	8	8	0	8	0	6	0	
PISAE	49	42	39	3	37	5	25	3	
TOTAL	163	148	89	22	46	29	73	17	
Percent of all Reporting	100	60	15	31	20	49	11		

a/ Those having some statistical activities.

b/ Includes respondents making informal use of statistical services at nearby experiment stations, universities, and through personal acquaintances, and excludes any with staff statisticians.

Table 4 shows the statistical services used by the respondents. Just under 90 percent of the 75 (Table 3, Cols 5 and 6) respondents made use of the professional services (formal or informal) available to them. The services used most were (1) analysis and interpretation and (2) development of specific plans for surveys or experiments. It is noteworthy that 30 percent of the users had help in the former without corresponding help in the latter, and over half of these did not have their specifications reviewed by the statistician.

Table 4 - Respondents using professional statistical services, by type of service, by Bureau

Bureau	Services Used							
	Respond-	Develop-	Review-	Conducting	Analysis	Preparing	Reviewing	
	ents	ing	ing	Expmts or	Tabu-	and	Manu-	
	Using	Specifi-	Specifi-	collecting	lating	interpre	scripts	Manu-
	Services	cations	cations	data	scripts	scripts	scripts	scripts
	(No)	(No)	(No)	(No)	(No)	(No)	(No)	(No)
AI	8	6	3	0	2	7	1	4
AIC	7	6	0	1	1	4	0	2
DI	1	1	0	0	0	1	0	1
EPQ	3	3	2	1	1	3	0	1
ES	1	1	1	0	0	1	0	1
HNHE	8	6	3	2	2	7	2	6
PISAE	39	22	19	4	6	32	6	17
TOTAL	67	45	28	8	12	55	9	32

Table 5 shows the kinds of additional services that were wanted by the 54 respondents desiring more help (46 shown in Table 1 and 8 listed in footnote 3, p. 1.) The services requested most were (1) interpretation of results, (2) methods of analyses, (3) setting up design and (4) development of statistical techniques. Of these 54 respondents, 46 (85%) wanted help in interpretation or analysis or both, but 32 (70%) of the latter did not want help in developing specifications, and 11 of these wanted no help in setting up designs either.

Table 5 - Respondents desiring additional statistical services, by type of service, by Bureau

Bureau	: :Developing: Specifi- cations:	: Setting up	: Instruc- tions for Design	: Methods of Collection	: Interpreting Results Analysis	: Developing Statistical Techniques
	(No)	(No)	(No)	(No)	(No)	(No)
AI	5	9	3	12	12	8
AIC	2	17	7	12	14	7
DI	1	0	0	1	0	0
EPQ	3	6	3	5	7	4
ES	0	1	1	1	0	1
HNHE	4	3	0	4	3	2
PISAE	2	2	1	6	6	2
TOTAL	17	38	15	41	42	24

If a statistician were to be added to the staff, (Table 6), the preferences for all bureaus combined were about equally divided between those wanting local services (at division, section, or local laboratory level) and those wanting services at some central point or for an entire bureau. The individual bureaus, however, showed decided preference.

Table 6 - Respondents Specifying a Preferred Organizational Position for an Additional Statistician

Bureau	: : ARA :	: Bureau or central point	: Local
	(No)	(No)	(No)
AI	1	6	10
AIC	0	2	20
DI	1	1-1/2	1/2
EPQ	0	12	2
HNHE	0	1	7 ^{a/}
PISAE	1	23	10
TOTAL	3	45-1/2	49-1/2

^{a/} Includes suggestion for complete coverage at some level--preferably for each division. If not available for all divisions, then for all bureaus, and if not for all bureaus, then for ARA.

The general opinion was against centralized computing service. For ARA service, the votes were 19 for and 91 against; for bureau service 26 for and 89 against. With the exception of Experiment Stations (which cast its 1 vote for ARA service) each bureau voted decidedly against the centralized service. Whether the volume and location of work among those wanting centralized service is enough to justify setting up such service cannot be determined directly from these questionnaires. A list of the respondents making the requests can be made available if the matter is to be pursued.

Eighty-five votes were cast for on-the-job training and 34 against. One respondent suggested having a particularly qualified employee sent for university training.

Suggestions were requested in the questionnaire concerning problems in techniques on which research workers believe professional statisticians should concentrate their attention. The specific suggestions are listed below. (Sources refer to outline number in Appendix B.)

1. Analysis of experimental data where small numbers and missing plots are involved (BAI-I D 2).
2. Methods for analyzing irregular and nonorthogonal data; investigation of the variances of variances and further work on variance components to provide methods for testing and handling intraclass correlations and estimates of variance components; detailed descriptions of methods available for solution of matrices and their statistical applicability; and description of the use and applicability of such procedures as the discriminant function technique (BAI-I D 3).
3. Standardized symbols and terminology (BAIC-II L).
4. Designing experiments to analyze data having multiple variates. (BAIC IIIC, F) (BPISAE I E).
5. Prepare statement on form for simple charts and graphs (BEPQ X).
6. Determining size and design of sample for unevenly distributed population (BEPQ XI B).
7. Expand education in research method (ES).
8. Develop inexpensive methods of measuring variability (BHNHE IV).
9. Narrow the gap between theory and practice. There is too much emphasis on bias as compared with other errors (BPISAE IA7).

Other suggestions were offered on the graduate school curriculum:

1. Not enough mathematical foundation (BAI I B).
2. Too theoretical or too technical (BHNHE I) (BPISAE II A3) (BAI IC) (BAIC II) (BEPQ X).

3. Too general--would like application to own problems. (BAI ID1), (BDI I), (BEPQ VI), (BPISAE II D).
 - (a) Have workshop (BHNHE II).
4. Beltsville employees cannot take early courses in D. C. (BAI II AA).
5. Would like correspondence courses (BAIC IA).
6. Too much computation (BAIC II H).
7. More courses at BPI (BEPQ VI) (BPISAE III B1).
8. Mimeograph blackboard notes and have more time for discussion (BHNHE II).
9. Standardize symbols (BHNHE II).
10. More courses meeting once a week (BHNHE IV).
11. Devise scheme to keep more of announced classes open. (Prospective students might get together to take the same courses at the same time) (BHNHE IV).
12. Want course in research methods (BPISAE IA 7).
13. Too much survey work--not enough on experimental design (BPISAE IIB).

Appendix C contains a summary of the questionnaires in each Bureau.

Although the respondents' general opinion of statistics and statisticians cannot be summarized from this kind of questionnaire, some comments they made throw an interesting light on the subject. Most show an appreciation of statistical methods and a desire for the cooperative assistance of the statisticians. Some, however, fear that their programs will be restricted and other programs imposed by persons who have no knowledge of the subject matter and who want to glorify statistics for its own sake. Others think of statistics merely as complex or voluminous computations. Several stated that the subject matter of their research does not lend itself to statistical analysis. Obviously, there is some need for improvement of professional relations and of means of conveying to research workers the tools that can be useful to them.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Administration

Questionnaire on Statistical Activities

Bureau _____

Working Unit _____

Location (geographical) _____

(Note: It is suggested that all questions and the instructions be studied before attempting to answer this questionnaire.)

1. Indicate in a short statement (Not over two paragraphs) the nature of the statistical activities of your unit, including the kind of data which your unit collects or analyzes and the purposes for which such data are collected.
2. Approximately how many professional persons GS-11 and above, GS-5 to GS-9, and how many clerks are engaged in the work described in Question 1?

Availability of services of professional statisticians.

3. If the assistance of a professional statistician(s) is available, indicate the organizational position of the statistician(s).
4. On how many occasions have members of your unit requested the help of a professional statistician during the past year?
5. Indicate ways the services of a professional statistician(s) have been used; such as: (a) Developing specifications for surveys or experiments, (b) Reviewing specifications for surveys or experiments, (c) Conducting experiments and/or collecting data, (d) Tabulation of data, (e) Analysis and interpretation, (f) Preparation of manuscripts, (g) Reviewing manuscripts.

Availability of services of non-professional statisticians.

6. If the assistance of a non-professional statistician(s) is available, indicate his organizational position.
7. On how many occasions have members of your unit requested the help of a non-professional statistician(s) during the past year?

8. In what ways have the services of a non-professional statistician been used, such as: (a) Developing specifications for surveys or experiments, (b) Reviewing specifications for surveys or experiments, (c) Conducting experiments and/or collecting data, (d) Tabulation of data, (e) Analysis and interpretation, (f) Preparation of manuscripts, (g) Reviewing manuscripts.
9. Is the statistical consulting assistance available to your unit adequate? Explain (If Yes, skip to Question 12.)
10. What percentage of a professional statistician's time could your unit use effectively?
11. In what phases of the work of your unit do you feel that additional statistical service would be beneficial: (a) Development of specific objectives or plans of the survey or experiment including hypotheses to be tested, (b) Setting up the experimental or sample design, (c) Preparation of instructions covering the process of collecting the data after the design has been established, (d) Methods of analysis, (e) Interpretation of the results, (f) Development of special statistical techniques.
12. If additional professional statisticians were added, where do you think they should be located organizationally? Why?
13. What would your reaction be to having a centralized computing service in your Bureau? In ARA?
14. What are the main problems in statistical techniques on which you believe professional statisticians should concentrate their attention?
15. Indicate the extent of participation and attendance of members of your staff during the past two years at seminars, special conferences, or workshops dealing with statistical methods.
16. How many employees have taken courses in statistics since entering full time employment? What was the nature of the courses: In residence at a University or College? Correspondence course? In-Service training course? Other?
17. Should facilities be made available for on-the-job training in experimental design and statistical methods?
18. Give any criticisms or suggestions you might have on the statistics curriculum in the Department of Agriculture Graduate School.

* * *

Appendix B. Organization and Report Status of Units having some Statistical Activities

Bureau of Animal Industry

Division and section	Reporting	Not reporting	Location 1/
I. Animal Husbandry Division			
A. Meat Section.....	x		
B. Animal Nutrition Section.....	x		
C. Cattle Research Station.....	x		
C & E. Livestock Research Station.....	x		
D. 1. Sheep and Goat Breeding.....	x		
2. Sheep Office.....	x		
3. Sheep Experiment Station and Western Breeding Laboratory.....	x		
E. 1. Swine Investigations.....	x		Beltsville
2. Swine Investigations.....	x		Ames
F. 1. Poultry Breeding.....	x		
2. Poultry and Turkey Improvement Plans	x		
3. Poultry Research Laboratory.....	x		
4. Poultry Section.....	x		
G. Fur Farming Investigations.....	x		
II. Pathological Division			
A. Bacterial and Mycotic Disease Section			
1. Poultry.....		2/	x
2. Brucellosis Research.....	x		
3. TB of Livestock and of Acid-Fast Organism.....	x		
4. Mastitis Research.....		2/	x
B. Viral and Rickettsical Disease Section			
1. Swine Erysipelas.....		2/	x
2. Hog Cholera, Swine Influenza.....		2/	x
3. Poultry Viruses.....		2/	x
C. Exotic Disease Section.....			
D. Physics and Chemistry Section.....			x
E. Noninfectious Diseases: Hyperkeratosis of Cattle.....		2/	x
F. Miscellaneous: Anaplasmosis Project...	x		
AA. Poultry Research.....	x		
BB. 1. Animal Disease Station.....	x		Beltsville
2. " " "	x		D. C.
CC. Regional Animal Disease Research Laboratory.....	x		
III. Zoological Division			
A. Poultry Parasite.....		2/	x
B. 1. Ruminant Parasite Investigations....		2/	x
2. Sheep Parasite Investigations.....	x		
C. Swine Parasite Investigations.....	x		
D. 1. Miscellaneous Parasite Project....	x		
2. Parasites of Domestic Rabbit.....	x		
E. 1. Section for Treatment of Internal Parasites--Laboratory.....	x		
2. Treatment Section.....	x		
F. Section for Treatment of External Parasites--Ectoparasitic Unit.....	x		
Total.....	27	3/ 11	

1/ Not always reported. Shown here only when needed for identification.

2/ Respondent reported no statistical activities and did not answer questions.

3/ Includes the 9 carrying footnote 2/ which have been included with those reporting in tables 2 and 3.

Appendix B. Organization and Report Status of Units having some Statistical Activities

Bureau of Agricultural and Industrial Chemistry

Division and section	Reporting	Not reporting	Location 1/
I. Southern			
A. Analytical, physical-chemical, and physics.....	x		
B. Cotton chemical processing.....	x		
C. Cotton fiber.....	x		
D. Cotton mechanical processing.....	x		
E. Engineering and development.....	x		
F. Protein and carbohydrate.....	x		
G. Oil and oilseed.....	x		
H. Sugarcane products.....		x	
I. Tung oil investigations.....	x		
J. Sugarcane products investigations....		x	
K. Food fermentation investigations.....	x		
L. Naval stores investigations.....	x		
M. Fruit and vegetable products investigations.....	x		Winter Haven, Fla.
II. Western			
A. Analytical, physical-chemical, and physics.....	x		
B. Biochemical.....		2/ x	
C. Engineering and development.....	x		
D. Enzyme.....		3/ x	
E. Fruit processing.....	x		
F. Pharmacology.....		2/ x	
G. Poultry products.....	x		
H. Protein.....	x		
I. Vegetable processing.....	x		
J. Fruit and vegetable products investigations of S. Calif. and Ariz.	x		
K. Fruit and vegetable products investigations of Pacific Northwest.....	x		
L. Natural rubber extraction and processing investigations.....	x		
III. Eastern			
A. Analytical, physical-chemical, and physics.....	x		
B. Hides, tanning materials and leather	x		
C. Biochemical.....	x		
D. Oil and fat.....		2/ x	
E. Carbohydrate.....		2/ x	
F. Protein.....		2/ x	
G. Engineering and development.....	x		
IV. Northern			
A. Agricultural residues.....		2/ x	
B. Motor fuels evaluation.....		2/ x	
C. Analytical, physical-chemical, and physics.....	x		
D. Oil and protein.....	x		
E. Engineering and development.....	x		
F. Starch and dextrose.....	x		
G. Fermentation.....	x		

Appendix B. Organization and Report Status of Units having some Statistical Activities

Bureau of Agricultural and Industrial Chemistry--Continued

Division and section	Reporting	Not reporting	Location <u>1/</u>
V. Biologically Active Chemical Compounds Division.....		x	
VI. Allergen Investigations.....		x	
Total.....	30	4/ 11	

1/ Not always reported. Shown here only when needed for identification.

2/ Respondent reported no statistical activities and did not answer questions.

3/ To be discontinued.

4/ Includes the 7 carrying footnote 2/ which have been included with those reporting in tables 2 and 3.

Appendix B. Organization and Report Status of Units having some Statistical Activities

Bureau of Dairy Industry

Division and section	Not Reporting	Reporting
I. Dairy Cattle Breeding, Feeding, and Management Division.....	x	
II. Nutrition and Physiology Division....	x	
III. Dairy Products Research Laboratory Division.....	x	
IV. Dairy Herd Improvement Investigations Division.....	x	
Total.....	4	0

Appendix B. Organization and Report Status of Units having some Statistical Activities

Bureau of Entomology and Plant Quarantine

Division and section	Reporting	Not reporting	Location 1/
I. Insecticides-Chemistry Division of Insecticide Investigations		x	
II. Division of Insect Identification.....		x	
Research			
III. Division of Bee Culture.....	x		
IV. Division of Cereal and Forage Investigations.....	x		
V. Division of Cotton Insect Investigations.....	x		Waco, Tex.
	x		Stoneville, Miss.
	x		College Sta., Tex.
	x		Florence, S.C.
	x		Tucson, Ariz.
	x	2/ x	Tallulah, La.
	x		Brownsville, Tex.
VI. Division of Forest Insect Investigations.....	x		
VII. Division of Fruit Insect Investigations	x		
VIII. Division of Insects Affecting Man and Animals.....	x		
IX. Division of Truck Crops and Garden Insect Investigations.....	x		
X. Division of Stored Product Insect Investigations.....	x		
Control			
XI. Division of Plant Disease Control			
A. Region 1--Blister Rust Control.....	x		
B. Region 4--Blister Rust Control.....	x		
C. Region 5--Blister Rust Control.....	x		
D. Region 5--Barberry Eradication.....	x		
XII. Division of Grasshopper Control.....	x		
XIII. Division of Gypsy Moth Control Project		2/ x	
Total.....	18	3/ 4	

1/ Not always reported. Shown here only when needed for identification.

2/ Respondent reported no statistical activities and did not answer questions.

3/ Includes the 2 carrying footnote 2/ which have been included with those reporting in tables 2 and 3.

Appendix B. Organization and Report Status of Units having some Statistical Activities

Bureau of Human Nutrition and Home Economics

Division and Section	Not reporting
I. Food and Nutrition	
A. Food preparation and preservation	x
B. Composition and nutritive value..	x
C. Food and nutritional requirements	x
II. Textiles and Clothing.....	x
A. Utilization of fabrics	
B. Household maintenance of fabrics	
C. Clothing investigations	
III. Housing and Household Equipment	
A. Rural housing requirements.....	x
B. Functional design and performance of household equipment....	x
IV. Family Economics	1/
A. Family composition and levels of living	
B. Home management.....	2/
C. Economics of food	
Total.....	8 0

1/ Composite report with 2 sets of answers when not identical for sections A and C. Counted as 2 reports for this survey.

2/ Program not activated.

Appendix B. Organization and Report Status of Units having some Statistical Activities

Bureau of Plant Industry, Soils, and Agricultural Engineering

Division and section	Reporting	Not reporting	Location 1/
I. Field Crops			
A. Division of Cereal Crops and Diseases			
1. Barley.....	x		
2. Corn.....	x		
3. Grain Sorghum.....	x	x	
4. Seed Flax.....	x		
5. Oats.....		x	
6. Rice.....	x		
7. Wheat.....	x		
B. Division of Cotton and Other Fiber Crops and Diseases			
1. Fiber Plant Investigation.....	x		
2. Cotton Culture.....	x		
C. Division of Forage Crops and Diseases			
1. Alfalfa.....	x		
2. Clover.....	x		
3. Hay and Pasture Grass.....			
4. Pasture Improvement in N.E.	x		
5. Lespedeza...and Misc. Legumes.....	x		
6. Soybean.....	x		
7. Turf.....			
8. Foundation Seed Stocks.....	x		
D. Division of Rubber Plant Investigations			
1. Domestic Rubber.....			x
2. Plantation Rubber in W. Hemisphere..			x
E. Division of Sugar Plant Investigations	x		
F. Division of Tobacco, Medicinal, and Special Crops	x		
1. Tobacco.....	x		
2. Drugs.....		x	
3. Hops.....		x	
G. Division of Weed Investigations.....	x		
II. Horticultural Crops			
A. Division of Fruit and Nut Crops and Diseases			
1. Citrus and Subtropical Fruit Section	x		
2. Deciduous Fruit Section.....	x		
3. Nut Crops Section.....	x		
B. Division of Vegetable Crops and Diseases	Summary 2/		
1. Potatoes and Onions.....	x		
2. Peas and Beans.....	x		
3. Lettuce.....	x		
4. Cheyenne Horticultural Field Station	x		
C. Division of Ornamental Plant Crops and Diseases.....	x		
D. Division of Handling Transportation and Storage of Horticultural Crops	Summary 2/		
1. Handling and Packaging.....	x		
2. Storage.....	x		
3. Post-Harvest Diseases.....	x		
4. Transportation.....		x	
5. Quality Evaluation.....		x	

Appendix B. Organization and Report Status of Units having some Statistical Activities

Bureau of Plant Industry, Soils, and Agricultural Engineering--Continued

Division and section	Reporting	Not reporting	Location 1/
II. Horticultural Crops--Continued			
E. Division of Forest Pathology.....	x		
F. Division of Nematology Investigations..	x		
G. Basic Studies of Plant Growth and Development			
1. Hormone Project (Fruit and Nut Crops and Diseases).....	x		
2. Photoperiodism Studies.....	x		
3. Chemical Services.....	x		
III. Soils.....	Summary 2/		
A. Division of Soil Management and Irrigation.....	x		
B. Division of Fertilizer and Agricultural Lime			
1. Mixed Fertilizer.....	x		
2. All other.....	x		
C. Division of Soil Survey			
1. Productivity and Use of Soil Types	x		
2. Climatology.....	x		
D. Plant Soil and Nutrition Laboratory....		x	
IV. Agricultural Engineering			
A. Division of Farm Machinery.....	x		
B. Farm Buildings and Rural Housing.....	x		
C. Mechanical Processing of Farm Products	x		
D. Farm Electrification.....	x		
Total.....	42		7

1/ Not always reported. Shown here only when needed for identification.

2/ Summary received but not counted as a report because in general, it duplicated individual reports. Any additional information was included with the report of the unit to which it applied.

Appendix C

Questionnaire Summary by Bureau

Bureau of Animal Industry

Thirty-six units were included in this study. They excluded 2 that did not report at all, but included 9 that indicated statistics were not used in their work.

There was one professional statistician on the staff, a GS-7 servicing the Meat Section of the Animal Husbandry Division. The Livestock Research Station, the Swine Investigations Section at Ames, Iowa, and the Poultry Breeding Section, all in the Animal Husbandry Division, reported using frequently the services of a professional statistician in experiment stations. Four other units had occasional statistical services from other bureaus or unspecified sources. Twenty-eight used no service. Seventeen of them had none available, 2 had, and 9 did not specify. The services used most were for planning (developing and reviewing specifications) and analysis and interpretation.

Eighteen units had no non-professional statistical services available. Only one had professional statistical services. The 18 using non-professional services used it most for analysis and interpretation of data (14 units) and specification development came next (7 units.)

Twelve units (including the four who have frequent professional services) considered their statistical services adequate. Fifteen would like additional service, the Poultry and Turkey Improvement Plans Unit desiring a full-time statistician, the Cattle Research Station wanting thirty percent, other Animal Husbandry units wanting about 75 percent, and other units desiring about 30 percent of a statistician's time.

The votes for organizational position of additional statisticians are as follows: ARA 1, Bureau 6, nearby 10. Nineteen others did not specify, or wanted none. Computing service centralized in either ARA or the Bureau would be satisfactory to more than half (about 60 percent) of the respondents and 21 of the 25 answering the question were in favor of on-the-job training.

The Bureau of Agricultural and Industrial Chemistry

Thirty-seven units were included in this survey. They excluded 4 that did not report at all, but included 7 that indicated statistics were not used in their work.

There were no professional statisticians on the staff and of the 8 respondents (in the Southern, Western, and Northern Laboratories) having statistical services available, only two (both in the Southern Laboratory) made use of such services more than twice in the last year.

Twenty respondents, some in each laboratory had non-professional statisticians on their division staffs. These included four respondents that had professional statistical services available from nonstaff sources. There were five non-professional statisticians grade GS-11 or above, eight GS-5-9, one GS-4 and six whose grades were not reported. Three other

respondents reported that they could make use of the services of these same non-professional statisticians. Eight used these services frequently, seven used them five or fewer times, and five reported no use of the available services. Analysis and interpretation is the service reported used most (18 units), planning (developing or reviewing specifications) is next, reported by 15 units. Twelve units reported adequate statistical service. Of the 17 that wanted additional service, all wanted help in setting up designs, 14 wanted advice on interpretation of results, 12 on methods of analysis. Other services were wanted also. The Cotton Mechanical Processing Division in the Southern Laboratory and the Natural Rubber Extraction and Processing Division in the Western Laboratory each wanted a full time statistician in their Divisions. Vegetable Processing Division in the Western Laboratory and Analytical, Physical, Chemical, and Physics Division in the East could use one-half and one-fourth respectively of a statistician's time. The other divisions in the Western Laboratory wanted about one-third and others in the South and East combined would like about one-half of a statistician's time. If a statistician were added to the staff, the Fermentation Division of the Northern Laboratory would like him in Chicago and the Analytical, Physical, Chemical, and Physics Division wanted him in Washington. The other Divisions reporting wanted services locally--1 in the Section, 3 in the Division, 12 in the Laboratory or Field Station and 4 not specifying an organizational position. Computing services in ARA or the Bureau was wanted by only 3 respondents and 22 are in favor of on-the-job training.

Dairy Industry

No professional statisticians were on the staffs of the four respondents. The Nutrition and Physiology Division occasionally consulted BPISAE or BAE statisticians for help in developing specifications, analysis and interpretation and review of manuscripts. There were also three non-professional statisticians on its staff but their services were not used. Dairy Cattle Division occasionally calls on the services of a non-professional statistician in the Division, but would like about 5 percent of the time of a professional statistician in Washington or Beltsville to help in developing plans and objectives. The Dairy Herd Division twice last year consulted a BAE non-professional statistician for help in analysis and would like about 5 percent of the time of a statistician in ARA for advice on methods of analysis. None of the respondents wanted central computing service and three were in favor of on-the-job training.

Bureau of Entomology and Plant Quarantine

Questionnaires from 11 divisions (20 respondents) that were concerned with research and control were tabulated. They excluded 2 divisions that did not report at all, but included 2 (one division and one respondent in another division) that indicated statistics were not used in their work. There were no professional statisticians on the Bureau staff. Four divisions reported that they had access to the services of college or university statisticians and one consulted with State Experiment Station statisticians. Two of these divisions made no use of such services in 1951, however. The others had help in planning (3), conducting experiments (1), tabulation (1),

analysis and interpretation (3) and reviewing manuscripts (1) with varying frequency. Seven divisions had non-professional statisticians. Four of these had professional services as well, leaving 3 with no statistical services available. The non-professional statistical services used were analysis and interpretation, development of specification for surveys or experiments and reviewing manuscripts. Most didn't specify frequency. About one-half the divisions were satisfied with the amount of statistical services available, but the Division of Insects Affecting Man and Animals could use one statistician full time and another half time. The other divisions could use about 35 percent of a statistician's time. If a statistician were added to the staff 8 divisions (10 respondents) wanted him at miscellaneous central points (includes bureau office) and 2 (2 respondents) at field stations.

Based on majority vote within the divisions, 2 divisions were in favor of centralized computing service in ARA and 7 were against (four respondents were in favor and 11 against). The total vote was essentially the same with regard to centralized Bureau computing service (three respondents voted in favor and 11 against). Five divisions (includes one division with 4 respondents voting for and 2 against) were in favor of on-the-job training and 3 (includes one division with 3 respondents voting against) did not want it.

Office of Experiment Stations

One report was received from the head of the division in charge of the two federally operated programs in Puerto Rico and the Virgin Islands. There was no professional statistician on the staffs, but others had been consulted. Two GS-12 and one GS-5 non-professional statisticians were consulted more than 10 times and all types of services were requested. About 10 percent of the time of a statistician could be used for most services. The respondent was in favor of an ARA computing service but not a Bureau service and also in favor of on-the-job training in the form of refresher courses at 5-year intervals.

Human Nutrition and Home Economics

Eight reports were tabulated--seven section reports and one from a division covering three sections. Two divisions had professional statisticians on the staff who were consulted frequently for all services in one division and for planning, analysis, and review of manuscripts in the other. A third division and one section of the fourth division had a service contract with a statistical laboratory, one for occasional service in analysis, and the other for occasional help in planning and review. Three divisions had assistant heads and several project leaders who were non-professional statisticians and who were consulted for all services. Three respondents reported adequate statistical services; two wanted one-half time service; and each of two more could use a statistician for one-fourth time. One did not specify the time. All wanted an additional statistician to be placed in the division (6) or easily accessible. All voted against centralized computing service in ARA or Bureau. One division was in favor of on-the-job training and one was against. In the third division expressing an opinion, one section was for and one against.

Bureau of Plant Industry Soils and Agricultural Engineering

Forty-two reports were tabulated covering 20 divisions in four major units. Three of these reports pertained to two sections each. Excluded were seven research units that did not report. The Division of Cotton and Other Fiber Crops and Diseases has a professional statistician servicing its two sections. Twelve respondents make use of the services of Experiment Station statisticians. Nine of these and 28 others have access to the services of Bureau statisticians in the Biometrics Section and two have services from unspecified sources. Of the 42 reporting availability of professional statistical services, 9 used them frequently or as many as 15 times a year; 18 reported occasional use or between 8 and 10 times; 12 reported infrequent use or do not specify frequency, and 3 reported no use. Thirty-three had used the services for planning (22 for developing and 19 for reviewing specifications), 32 for analysis, and 17 for reviewing manuscripts.

Twenty-eight respondents reported availability of non-professional statisticians on their staff or other organization. Only eight had made use of the service frequently or as much as once a month. Non-professional services were most used for the same purposes as professional; 18 using it for planning (15 for developing and 13 for reviewing specifications,) 18 for analysis, and 15 for reviewing manuscripts. Thirty-six respondents reported that statistical services were adequate; two reported adequate services at some stations, but not at others; and four others would like more help. These last six would each like between 5 and 30 percent of a statistician's time, wanting in total the time of one statistician. All wanted help in methods of analysis and interpretation of results, and one or two wanted help in each of the other aspects. If a statistician were added to the staff, his location should be in the Bureau according to 23, local according to 10, and other or not specified by 9. Thirty-two do not want central computing service in ARA; four did. Twenty-eight did not want it in the Bureau; twelve did. Twenty-five were in favor of on-the-job training (seven with qualifications as to personnel or availability of other courses); thirteen voted against.



